

18 feet, 8 inches in circumference breast high. It is still in fair condition. Another cypress, growing about 1,000 feet from the ocean shore and which shows no mark of fire, has a girth, breast high, 15 feet, 4 inches with a spread of 90 feet in one direction and 75 feet in the other. At the ground, including the roots, the tape measure showed 34 feet as its circumference.

When we were trying to have the Cypress Point grove made into a National Monument its land value was deemed insignificant; at the present time villa sites, with shore frontage, are held at ten thousand dollars per acre.

Monterey, November 16, 1921.

PHYSIOLOGICAL BILABIATION AND PHYSIOLOGICAL IRREGULARITY IN THE FLOWERS OF CALIFORNIAN ANGIOSPERMS.—I

WILLIS LINN JEPSON

In laying down principles of classification and phylogeny in the field of the Angiosperms it is taken as an axiom that regular (actinomorphic) corollas are to be regarded as representing a more primitive state than irregular (zygomorphic) corollas. Such an axiom may be defended, in part, on the grounds of the general morphology of the flower in connection with the morphology of the angiospermic plant as a whole. The cases of teratology in which highly irregular flowers become regular or sub-regular also bear on this matter. Reference may be made, as an example, to the highly zygomorphic type of flower in *Scrophularia californica* Cham., which, at times, as an abnormal condition, becomes sub-regular.¹ Numerous other instances in the field of teratology might be given.

A long series of families of flowering plants as represented in California are characterized by regular corollas. In many of these families, more or less widely scattered phylogenetically, there is shown an evident tendency to exhibit species with irregular flowers, or even occasionally genera. The irregularity that is here under discussion is limited to what may be called physiological irregularity, that is those cases in which the parts of the corolla remain morphologically of the same size and shape, but the parts are so disposed as to form a flower that is in structure constantly irregular or zygomorphic. It has been my practice in the field to speak of this peculiarity as *physiological irregularity* or, in some cases, as *physiological bilabiation*. It is now proposed to describe and discuss various species which illustrate this condition.

Clarkia pulchella Dougl. is a not uncommon plant on openly wooded slopes in the foothills of California, usually growing in a soil where there is at least some surface woodland mulch. Long ago I had noted and described the four petals as spreading in pairs

¹ Cf. Jepson, *Erythea*, 7:123-127, fig. 3 (1899).

right and left so as to make a flower which is markedly zygomorphic from a physiological standpoint.² In this connection it is now necessary to describe the stamens which are eight in number, four long and four short. The long stamens bear crimson anthers which open only by a pore beneath the terminal appendage. The four short stamens have white anthers that open their full length. Each and every filament has a tuft of hairs at the throat, so that there appears to be a ring of hairs at the throat. Below this in the cup, there is another ring of hairs, very well defined, but not so dense. This species has been studied at numerous stations in the field but the following notes were made in a colony on the upper San Benito River at the mouth of Lorenzo Creek.

This colony grew under a Blue Oak (*Quercus douglasii* H. & A.) tree where the steep slope was covered with leaf mold. The records were made in early June, 1927. Bees are now visiting the flowers. The bee alights on the protruding white style and the stamen cluster and hangs on by these organs. The petals, as said, spread right and left, and do not interfere with alighting on the flower from above or swinging the body freely downward. After establishing himself on the flower the bee feeds on the freely exposed pollen masses of the short white anthers, his body, with its hairy under surface, resting on the long stamens and brushing up pollen from the long crimson anthers. These anthers have the pollen so disposed that the bee could not easily feed upon it; but this pollen is evidently carried by the under parts of the bee to another flower where it is thrust directly against the stigmas of the protruding style which stands directly in the way of the insect visitor.

It seems a natural inference that the physiological irregularity in *Clarkia pulchella*, which I have noted as a widely spread phenomenon, is to be associated with the biological needs of the flower in relation to insects.

Berkeley, September, 1927,

FIELD NOTES ON CERTAIN BRODIAEA SPECIES IN HUMBOLDT COUNTY

MILO S. BAKER

These notes concern my nos. 137 a, b and c, which is *Brodiaea congesta*, nos. 138 a, b and c, which is *B. venusta* and nos. 139 a, b and c, which is *B. ida-maia*, as observed by the writer in Humboldt County. These species are found growing within a few feet of each other, at the head of the South Fork of Yager Creek, just inside the fence on the west side of the road, a few hundred feet from the east gate of the Lamb ranch. The date is July 28, 1923.

Brodiaea ida-maia is very common through this region and far to the northward; *B. venusta* is quite uncommon and occurs, so far as I observe, only where *B. ida-maia* and *B. congesta* are near at hand. I find *B. venusta* at one particular spot where no *B. congesta*

² *Flora of Western Middle California*, 332 (1901), ed. 2, 277 (1911); *Man.* 673, fig. 660 (1925).